REMARKS

Claims 1-30 have previously been canceled. Applicants cancel claims 31-32 and submit pending claims 33-34. Applicants refer to page 19, line 21 to page 20, line 14, page 25, lines 3-5, page 28, lines 13-15, page 37, line 15 to page 39, line 10 in the specification, and Figs. 21-22, together with their corresponding description in the specification, for exemplary embodiments of and support for the claimed invention. No new matter has been added.

Claims 31 and 32 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,630,304 to Borth et al. in view of U.S. Patent Application Publication No. 2003/0198304 to Sugar et al., and further in view of U.S. Patent No. 6,385,548 to Ananthaiyer et al. Applicants cancel claims 31-32 and submit claims 33-34 in a good faith effort to more clearly recite the invention.

Even assuming, arguendo, that it would have been obvious to one skilled in the art at the time the claimed invention was made to combine Borth et al., Sugar et al., and Ananthaiyer et al., such a combination would still have failed to disclose or suggest,

> "[a]n echo canceller that prevents echoes from occurring, comprising:
>
> (a) a first input controller that comprises a microphone and an A/D converter, wherein the microphone supplies the input sound signal to the A/D converter and the A/D converter converts the input sound signal into voice/noise data in digital form;
>
> (b) a second input controller that comprises a signal receiver and a decoder, wherein the signal receiver supplies an input coded speech signal to the decoder and the decoder decodes the input coded speech signal into decoded speech data;
>
> (c) an audio unit that comprises a D/A converter and a loudspeaker, wherein the D/A converter converts the decoded speech data into an analog speech signal and the loudspeaker outputs the analog speech signal as audible sound;
>
> (d) a coder that encodes an echo-cancelled sound signal for transmission to a remote end;
>
> (e) an input talkspurt detector comprising:

an input frequency spectrum calculator that calculates voice/noise frequency spectrum of the voice/noise data;

an input frequency spectrum calculator that calculates a voice/noise flatness factor indicating flatness of the voice/noise frequency spectrum and finds a maximum value of the voice/noise frequency spectrum, adds up differences between spectral components and the maximum value thereof, and generates a resulting sum of the differences as the voice/noise flatness factor; and

wherein the input sound flatness evaluator calculates an average of spectral components of the voice/noise data, normalizes the resulting sum of the differences by dividing by the calculated average, and outputs a normalized voice/noise flatness factor;

an input voice/noise discriminator that determines whether the voice/noise data contains a talkspurt, by comparing the normalized voice/noise flatness factor of the voice/noise frequency spectrum with a first predetermined threshold, and sets an input sound flag to indicate presence of a talkspurt in the voice/noise data;

(f) an output talkspurt detector comprising:

an output frequency spectrum calculator that calculates speech frequency spectrum of the speech data;

an output sound flatness evaluator that calculates a speech flatness factor indicating flatness of the speech frequency spectrum and finds a maximum value of the speech frequency spectrum, adds up differences between spectral components and the maximum value thereof, and generates a resulting sum of the differences as the speech flatness factor; and

an output voice/noise discriminator that determines whether the speech data contains a talkspurt, by comparing the speech flatness factor of the speech frequency spectrum with a second predetermined threshold, and sets an output sound flag to indicate presence of a talkspurt in the speech data; and

(g) an echo canceller module comprising:

a state controller that identifies states of the voice/noise data and the speech data by monitoring the input and output sound flags, and outputs an appropriate control command which is the identified states; and

an echo cancel unit that performs a subtraction process and an echo training process depending on the control command, wherein the subtraction process produces a pseudo echo signal by applying echo path characteristics on the speech data and outputs the echo-cancelled sound signal by subtracting the produced pseudo echo signal from the voice/noise data, and wherein the echo training process updates the echo path characteristics," as recited in claim 33. (Emphasis added)

Accordingly, Applicants respectfully submit that claim 33, together with claim 34 dependent therefrom, is patentable over Borth et al., Sugar et al., and Ananthaiyer et al., separately and in combination, for at least the foregoing reasons. The cited references also fail to disclose or suggest the additional features recited in claim 34, and thus, claim 34 is patentable over the references for at least this additional reason.

In view of the remarks set forth above, this application is in condition for allowance which action is respectfully requested. However, if for any reason the Examiner should consider this application not to be in condition for allowance, the Examiner is respectfully requested to telephone the undersigned attorney at the number listed below prior to issuing a further Action.

Any fee due with this paper may be charged to Deposit Account No. 50-1290.

Respectfully submitted,

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